PATENT SPECIFICATION

731,597

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COMPLETE SPECIFICATION

Method of and apparatus for manufacturing Endless Fibro-Cement Sheets

I, ALESSANDRO MAGNANI, an Italian citizen, of 6, Via Roma, Broni (Pavia), Italy, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a method of manufacturing an endless fibro-cement sheet which, if of suitable thickness, may be cut and utilised in the form of slabs while, if it is very thin, it may be wound continuously on a mandrel for making tubes or slabs by cutting in the latter case the tube of a suitable diameter along a generatrix and laying it flat.

According to this invention there is provided a method of manufacturing an endless fibro-cement sheet suitable for the manufacture of slabs and pipes, and in which a watery slurry is fed continuously and in an adjustable manner from a container provided with stirring means for thoroughly mixing the slurry over an upper horizontal operative run of a porous belt of textile material such as felt, for forming thereon a layer of adjustable depth of said slurry, characterised in that the watery fibro-cement slurry is fed by overflowing from said container over the operative upper run of the said felt forming the spillway of said overflow, so as to build up a layer equalling in depth the difference in level between the level of the slurry in the said container and the upper horizontal face of the operative upper run of said felt, the structure of the container, the stirring means for thoroughly mixing the slurry and the position of the felt being such that the composition of the watery slurry flowing onto said upper run equals that of the slurry in the container.

The apparatus for carrying out this method is described hereinafter with reference to the accompanying drawings which show diagrammatically its main features.

Figure 1 is a general diagram of the apparatus for carrying out the method of forming endless fibro-cement sheets:

Figures 2 and 3 are diagrammatical detail views of the outlet end of the apparatus for forming slabs and tubes, respectively, obtained by winding an endless thin sheet of a mandrel of a suitable diameter.

Figure 4 is a detail cross sectional view of the belt carrying the fibre-cement slurry.

Figure 5 shows the endless conveyor for the tubes to be aged which it simultaneously sets in rotation.

Referring to the drawings, 1 denotes the endless filtering belt, of which the upper run, stretched between the rollers 2 and 3, is the operative run in the process, while the lower run is acted upon by the belt washing means.

The device for placing the layer of fibro-cement on the belt 1 is arranged on the inlet of the belt and comprises a vat 4 having an opening cut in one of its sidewalls through which the belt extends, sealing the slot with the aid of the packing 6.

The vat 4 is fed through the conduit 25 with a quantity of fibro-cement slurry such as to give the desired layer thickness.

A stirring mechanism is arranged on the bottom of the vat 4 and affords a uniform distribution of the constituents of the slurry. A vertical partition 23 is arranged in front of the belt 1 where the belt seals the opening in the vat wall and in spaced relationship thereto, and assist in continuously circulating the slurry in the vat and in forming a layer S of a suitable thickness on the belt 1 by effect of the continuous movement of the latter. The layer is conveyed by the horizontal branch of the belt 1, which travels on rollers 26 and on the suction table or tables 10 for dehydration, on which the layer is consolidated by removal of most of the water contained therein. The layer carried by the belt is retained laterally by two rubber strips 7, figures 1 to 4.

On account of the considerable quantity of water contained in the slurry, a considerable vacuum would be required for removing water therefrom and would make impossible or, at

least, difficult the displacement of the belt 1 on the table 10 during suction. According to this invention, the difficulty is removed by causing the table 10 and the belt 1 to travel at the same speed over a certain length towards the position shown in dotted lines on the drawing. Upon reaching this position, suction through the conduit 10^1 is automatically cut off and the table 10 is rapidly returned to its initial position, whereupon it is again moved forward together with the belt and suction is restored, and so on. The return movement may be accomplished, for example, by means of a weight, a hydraulic ram or other suitable means, while the forward movement may be obtained merely by the adherence between the belt and table by the effect of suction.

By suitably proportioning the table length and stroke, and the vacuum and return stroke time, each point of the layer of slurry will be properly subjected to the suction through the table 10 and dehydrated, as the belt moves at a uniform speed.

For the sake of a more efficient dehydration a pressure roller 11 is arranged on the outlet end of the table 10 and rotated about its own axis. For fuller dehydration, the belt 1 carrying the asbestos cement layer is compressed between two rollers 12, 13.

If the slurry has been fed through the above-described device in a sufficient quantity for forming a fresh fibro-cement sheet L of the desired thickness, said sheet is withdrawn from the machine and cut by means of a known cutter to the required length for forming slabs.

If the slabs have to be formed by superposing thin elementary sheets, the arrangement diagrammatically shown in Figure 2 is adopted in which the thin fibro-cement sheet L is wound on a cylinder 14 of suitable diameter till the desired slab thickness is obtained, the slab being separated by cutting the resulting tube along a generatrix and laying it flat.

When manufacturing tubes, Figure 3, a very thin fibro-cement sheet is formed and a mandrel 14 is placed on the belt 1 above the roller 3, the mandrel 14 equalling in diameter the bore of the desired tube. Thin sheet L is wound on the mandrel 14 to the thickness of the desired tube T.

In order to improve the compactness of the structure, the tube being formed is compressed by known means, for instance by means of rollers 15—16, Figure 5, carried by an equipment 17 acted upon by rams 29.

When the tube wound on the mandrel reaches the desired thickness, the apparatus is stopped and supply of the slurry is cut off. The equipment 17 is then lifted by means of the rams 29 and the mandrel 14 carrying the tube T is brought on to a suitable support 19. If necessary, the tube is stripped from the mandrel 14 and threaded on a suitable core. The mandrels or the cores with the fibro-cement tubes T thereon are successively arranged on cradles for ageing.

The tubes T formed on the mandrels 14 are preferably arranged on two successive rollers of a set of rollers 20 connected together by an endless chain driven by wheels 31, Figure 5. The upper operative run of the roller chain bears on stationary guides 21, on which the rollers 20 are free to rotate. The forward feed of the roller chain and rotation of the rollers 20 about their axes continuously rotate the asbestos-cement tubes T oppositely to the supporting rollers 20. This serves the double purpose of feeding the tubes as they are formed and of conferring on them a satisfactory cylindrical shape by the effect of the movement of the supporting rollers 20.

The roller chain unit may be enclosed in a heated space in order to accelerate hardening of the tubes. The cores may be extracted and re-utilized as soon as the tube has sufficiently hardened, that is, along the chain path or at the chain end. Successively, the tubes are ultimately aged and finished in known manner.

What I claim is:—

1. Method of manufacturing an endless fibro-cement sheet suitable for the manufacture of slabs and pipes, and in which a watery slurry is fed continuously and in an adjustable manner from a container provided with stirring means for thoroughly mixing the slurry over an upper horizontal operative run of a porous belt of textile material such as felt, for forming thereon a layer of adjustable depth of said slurry, characterised in that the watery fibro-cement slurry is fed by overflowing from said container over the operative upper run of the said felt forming the spillway of said overflow, so as to build up a layer equalling in depth the difference in level between the level of the slurry in the said container and the upper horizontal face of the operative upper run of said felt, the structure of the container, the stirring means for thoroughly mixing the slurry and the position of the felt being such that the composition of the water slurry flowing onto said upper run equals that of the slurry in the container.

2. Method as claimed in Claim 1, wherein the continuous circulation of the watery fibro-cement slurry in the vat produced by the said stirring means is assisted by a vertical partition arranged within the vat at the rear of its wall adjacent the overflow and having its upper and lower edges spaced from the horizontal plane coincident with the upper surface of the porous belt and spaced from the bottom of the vat respectively.

3. Method as claimed in Claims 1 and 2 wherein the excess water in the slurry is rapidly separated through the porous belt so as efficiently to felt the fibrous material contained in the slurry, dehydration of the sheet deposited on the pull side of the endless belt

being continued by means of a suction box performing a reciprocating motion along the path of the pull side of the said porous belt.

4. Method as claimed in Claim 3, wherein the suction is effected during the movement of the box in the direction of feed of the fibro-cement layer on the pull side of the porous belt, the box being carried along in said movement by adherence to the said belt, suction being cut off during the quick return movement of the box to its starting position, by means of a counterweight or the like, independently of the movement of the porous belt.

For the Applicant,
F. J. CLEVELAND & COMPANY,
Chartered Patent Agents,
29, Southampton Buildings,
Chancery Lane, London, W.C.2.

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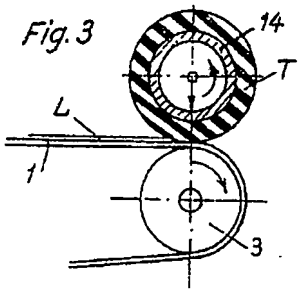
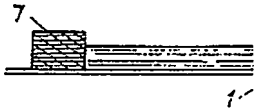
Fig. 3



Fig



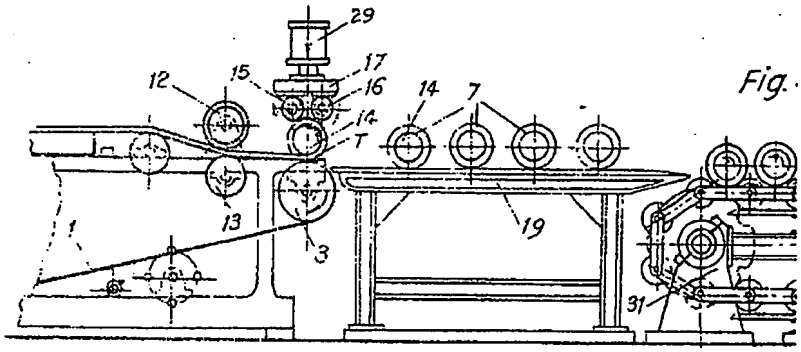
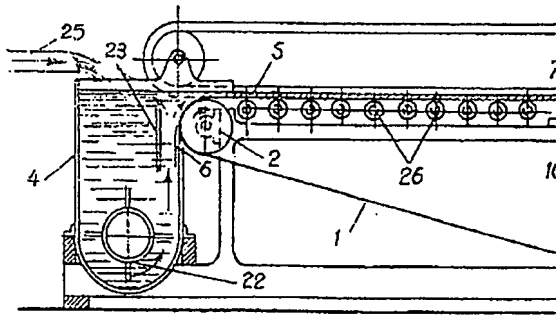


Fig.



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1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

14

T

Fig. 4

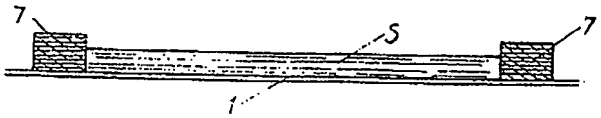


Fig. 2

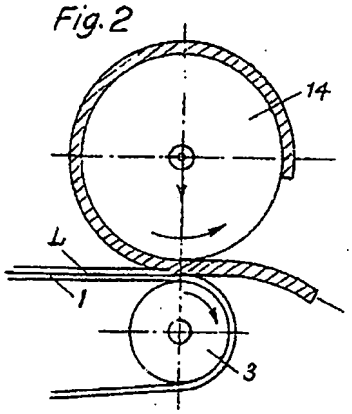


Fig. 5

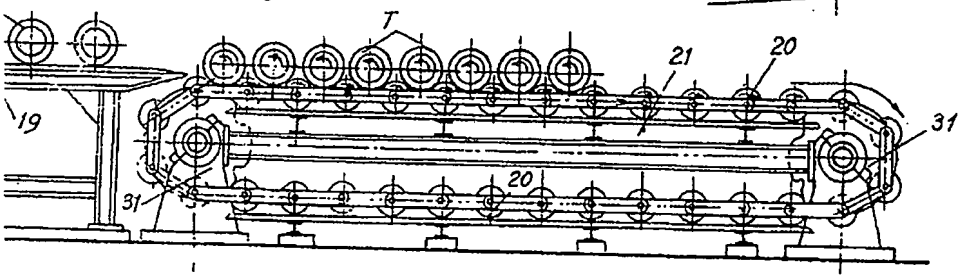
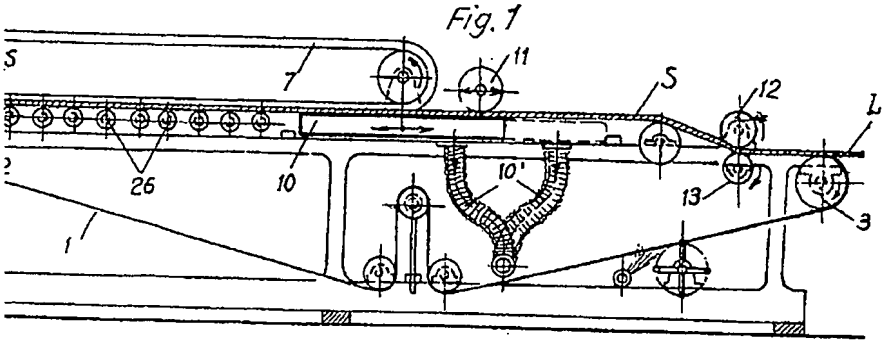


Fig. 1



731,597 COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

Fig. 3

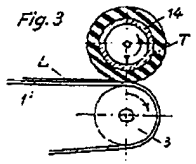


Fig. 4

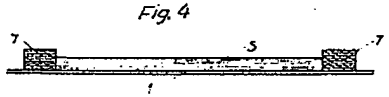


Fig. 2

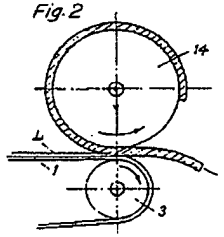


Fig. 5

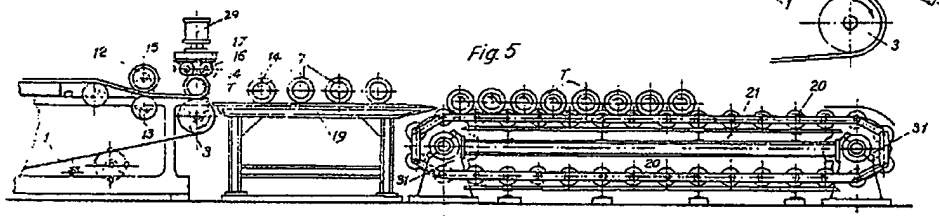


Fig. 1